(NTSC SYSTEM)

CG-911A

(PAL SYSTEM)

CG-912(B,M.N)

COLOR PATTERN GENERATOR

INSTRUCTION MANUAL

The Model CG-911A and CG-912 are portable color pattern generators producing color bars, dots, cross-hatches and center cross patterns. It is designed for testing and adjusting NTSC [PAL] system color and black/white TV receivers, video tape recorders and other video equipment. As an anfenoul 24P connector for remote control operation is provided with [T] type, the selection of the pattern is controlled with remote controller RT-62.

TABLE OF CONTENTS

FEATURES 3
SPECIFICATIONS 4
CONTROLS ON PANELS 7
Front Panel 7
Rear and Side Panel 10
OPERATION 12
Preliminarily Operation 12
Connection to TV Receiver 12
Pattern Operation 12
Selection of RF Channels 13
Remote Control Operation 14
PRECAUTIONS 15
MAINTENANCE AND ADJUSTMENT 16
Maintenance 16
Adjustment 17
PARTS LIST 19
OPTION 25
P.C. BOARD AND SCHEMATIC DIAGRAM 27

FEATURES

- NTSC system CG-911A and PAL system CG-912 color pattern generators provide full field, I.Q.W. or PAL U.V.W., chrominance and luminance functions.

- Chrominance and luminance levels can be set freely.
  CAL positions are provided to facilitate adjustments and repairs of color TV receivers.

- Pure colors and white balance can be checked and adjusted by red, blue, green and white rasters.

- Dynamic and static convergence can be checked and adjusted by cross-hatch and center dot.

- Center cross and dot allow raster alignments and convergence adjustments.

- Video output (75 ohms) and TV RF output (75 ohms) are provided for connection to video equipment and monitor TV receivers.

- Vertical and horizontal sync signals for easy observation of TV signal waveforms.

- Sync signals contain equivalent pulses. Phase is locked in color sub-carrier frequency.

- Progressive scanning reduces flickers of center cross and cross-hatch, permitting easy check and adjustment.

- Pattern and color selector switches, which are often used, each are composed of electronic switch, thus improving the maneuverability and reliability.

- With the KENWOOD remote controller RT-62, [T] type can remotely control all patterns.

SPECIFICATIONS

CG-911A [CG-912 B, M, N]

Pattern

Cross-hatch..... 20 × 16 white on black background, one dot in the center of screen.

Center cross ..... 1 × 1, white on black background, cross in the center of screen.

Dot ..... 15 × 20, white on black background.

Raster..... Red, blue, green, white

Color ..... 75% luminance NTSC [PAL] color bars
Upper section of screen:
75% luminance white, yellow, cyan, green, magenta, red, blue, black, from left to right.
Lower section of screen:
Q, −I, [U, V] 100% luminance white, black, from left to right.

NTSC I.Q.W OFF ..... Full field color bar with color bars on the upper section of screen in place of Q, −I, [U.V.] 100% luminance white and black on the lower section.
[PAL U.V.W]

CHROMA OFF..... Luminance pattern with chrominance removed from color bar signal.

LUMI OFF..... Chrominance pattern with luminance removed from color bar signal.

Sub-carrier frequency .....

NTSC	3.579545 MHz
PAL-B	4.433619 MHz
PAL-M	3.575611 MHz
PAL-N	3.582056 MHz

Video output

Output voltage ..... Fixed: 1V p-p (into 75-ohm load)
Variable: 0～1.5V p-p (into 75-ohm load)

Output impedance ..... 75 ohms

Polarity..... Positive (negative for sync signal)

RF output

Modulation system..... Negative modulation

Video frequency

CG-911A

	Japan CH (MHz)	USA CH (MHz)
A	CH2 97.25	CH5 77.25
B	CH3 103.25	CH6 83.25

* Japanese and USA channels are selectable.

[CG-912]

CH	West Europe CH (MHz)	Italy CH (MHz)	Australia CH (MHz)	New Zealand CH (MHz)	Brazil CH (MHz)	Argentina CH (MHz)
A	CH3. 55.25	CHA. 53.75	CH1. 57.25	CH2. 55.25	CH2. 51.25	CH2. 55.25
B	CH4. 62.25	CHB. 62.25	CH2. 64.25	CH3. 62.25	CH3. 61.25	CH3. 61.25

Output voltage ..... More than 10 mV rms (open circuit)
Output impedance ..... 75 ohms

Sync signal output

Frequency ..... Horizontal and vertical frequencies
Output voltage ..... Approx. 1V p-p (open circuit)
Output impedance ..... 75 ohms

Sub-carrier output

Frequency ..... Center frequency ±100 Hz, adjustable within ±5 Hz
Output voltage ..... Approx. 1V p-p (open circuit)
Output impedance ..... 75 ohms

Sync signal

		NTSC (Hz)	PAL-B (Hz)	PAL-M (Hz)	PAL-N (Hz)
Horizontal scanning frequency		15.734 k	15.625 k	15.734 k	15.625 k
Vertical scanning frequency	Interlace scanning	59.94	50.00	59.94	50.00
	Progressive scanning	60.05	50.08	60.05	50.08

Color burst ..... 8 cycles min. at back porch of horizontal sync signal

Video output signal level

NTSC

Tolerance	75% White	Yellow	Cyan	Green	Magenta	Red	Blue	Q	−I	Burst	Black	Sync signal level
Luminance level ±5% (%)	75	67	53	44	31	23	8	–	–	–	0	40
Chroma level ±5%(%)	–	33	47	44	44	47	33	20	20	20	–	–
Chroma phase ±5% (deg.)	–	167	284	241	261	104	347	33	−57	180	–	–

[PAL]

Tolerance		100% White	75% White	Yellow	Cyan	Green	Magenta	Red	Blue	U	V	Burst	Black	Sync signal level
Luminance level (%)		100	75	67	53	44	31	23	8	0	0	0	0	*
Chroma level (%)				33	47	44	44	47	33	20	20	20	–	–
Chro-ma phase	+V	–	–	167	284	241	61	104	347	0	90	135	–	–
	–V	–	–	193	76	119	299	256	13	0	270	315	–	–

*PAL-B, M 43
PAL-N 40

Notes: 1. The chroma level is a value where the range from the black level to the 100% white level is 100%.
2. The chroma phase is a value to the burst phase (180° with respect to B-Y axis.)
3. The sync. signal, and Q, –I [U.V.] burst levels are values where the standard level of the 100% white level is 100%.

Level control

Chroma level..... Color bar or raster chrominance level is adjustable to aprrox. ±20%.
The maximum amplitude of yellow and cyan color bar signals can be preset to the level of 100% white signal.

Luminance level..... The luminance level of all patterns is adjustable to aprrox. ±20%. The white signal level in raster can be preset to 100%.

Setup level..... The setup level of all patterns is adjustable to 0~10%. Black level can be preset to 7.5%.

Remote control operation

Pattern select..... 4 BIT BCD (negative logic)
Panel remote select..... 1 BIT (negative logic)
Remote control..... 1 BIT (negative logic)

Power requirements

Power supply voltage..... AC 100/120/220/240V, ±10%, 50/60 Hz
Power consumption..... Approx. 15W
Operating temperature..... 0 ~ 40°C

Dimensions

Width..... 190 mm
Height..... 128 mm
Depth..... 300 mm
* Projections not included.

Weight..... Approx. 3.5 kg

Accessories

AC power cord..... 1
Input cord (CA-41)..... 1
Replacement fuse (0.3A)..... 2
(0.7A)..... 2
Instruction manual..... 1

CONTROLS ON PANELS

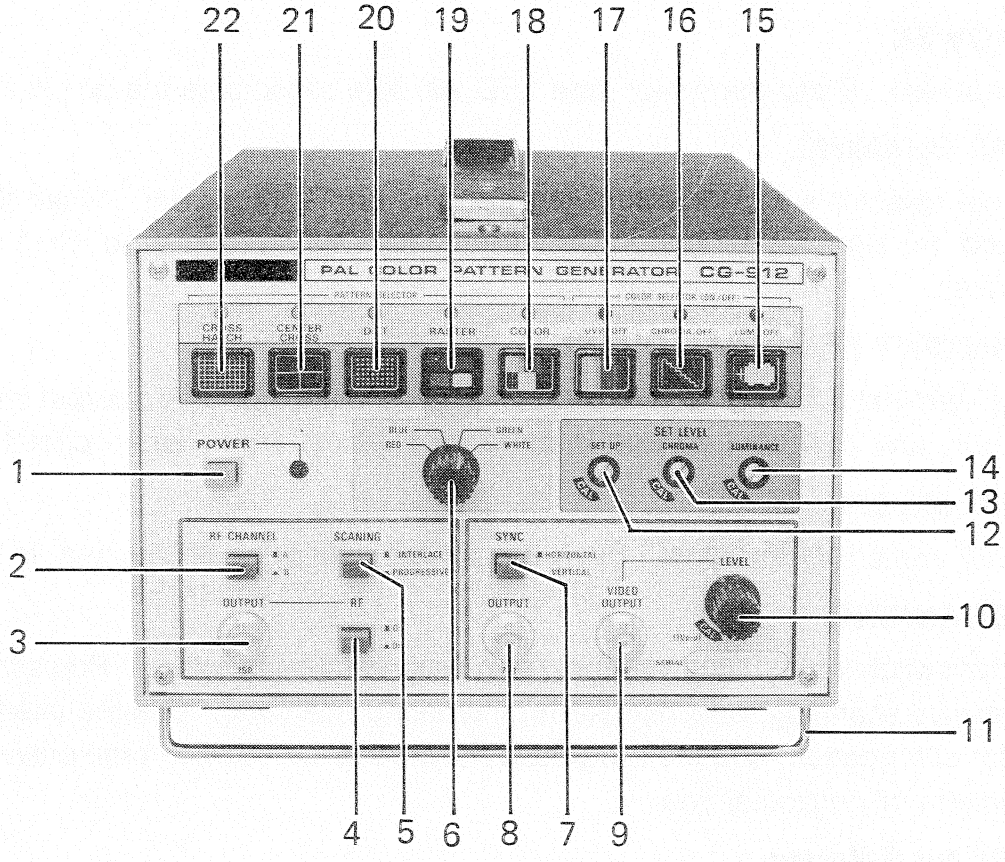


Fig. 1 Front Panel

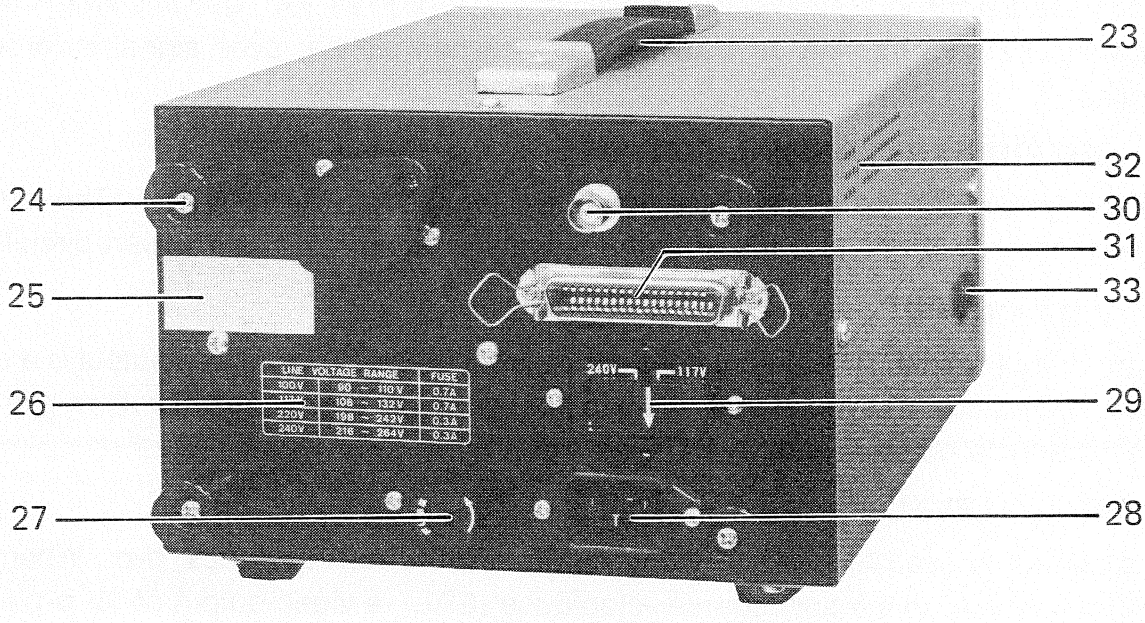


Fig. 2 Rear and Side Panel

FRONT PANEL

1. POWER

Power switch. Press the switch and LED will light to indicate the unit is in operation.

2. RF CHANNEL

Channel selector switch for displaying patterns on TV receiver. When the switch is pressed, RF signal is switched to CHB frequency. When released, CHA frequency is generated.

3. OUTPUT (RF SIGNAL OUTPUT)

Output terminal for RF signal selected by RF CHANNEL (2). The output impedance is 75 ohms, and the output voltage is more than 10 mV rms (open circuit).

4. RF ON/OFF

ON/OFF switch for RF signal. Push this switch, when the RF signal is not in use.

5. SCANNING

Selector switch for interlaced scanning and progressive scanning. Press the switch for progressive scanning, and release for interlaced scanning. Use the interlaced scanning for color pattern and the progressive scanning for monochrome pattern to reduce the flickers of horizontal line.

6. Raster Selector

This switch is used to select raster colors, red, blue, green and white (100% luminance). To obtain a black raster, set the PATTERN SELECTOR switch to COLOR and the COLOR SELECTOR switches to CHROMA OFF and LUMI. OFF.

7. SYNC.

Press this switch and a vertical sync signal is available at OUTPUT (8). Release the switch and a horizontal sync signal is available at OUTPIUT (8). Use this switch when adjusting TV receivers with an oscilloscope or when either sync signal is forcedly applied.

8. OUTPUT (SYNC. SIGNAL OUTPUT)

Output terminal for sync signal selected by the SYNC switch (7). The output impedance is 75 ohms and the output voltage is approx. 1V p-p (open circuit).

9. VIDEO OUTPUT

Video output terminal. The output impedance is 75 ohms. The video output is a composite video signal of sync signal, blanking signal, burst signal and pattern signals. The polarity is positive (negative for sync signal).

10. VIDEO LEVEL

This control is used to adjust the video output level from 0 to 1.5V p-p. When the control is turned to the fully counter-clockwise (CAL), a video output of 1V p-p is obtained at the output terminal.

11. Foot

Pull the foot forwards and it will be locked.

12. SET LEVEL (SET UP)

Turn this control clockwise and the video signal setup level can be varied by 0 ~ 10%. When the control is turned to the fully counter-clockwise (CAL), the set level is 7.5%.

13. SET LEVEL (CHROMA)

Turn this control clockwise and the color signal chrominance level can be varied by approx. ±20%. Normally, it should be set to the fully counter-clockwise position (CAL).

14. SET LEVEL (LUMINANCE)

Turn this control clockwise and the luminance level of each pattern can be varied by approx. ±20%. Normally, it should be set to the fully counter-clockwise position (CAL).

> **Note:**
> Turning the above controls (12 ~ 14) will also vary the RF modulation degree. To obtain the optimum modulation degree, adjust each of them to maintain the output voltage for 1V p-p at the VIDEO OUTPUT (9) (VIDEO LEVEL (10) at CAL).

15. LUMI. OFF

By pressing this button, the green pilot lamp lights above this button and the luminance component in color patterns is eliminated. Pressing the button once again will set the color patterns to be original state and the green lamp goes off.

16. CHROMA. OFF

By pressing this button, the green pilot lamp lights above this button and the chrominance component is eliminated. Pressing the button once again will set it to the original state and the green lamp goes off.

17. I.Q.W. [U.V.W.] OFF

With this button pressed, the green lamp lights above this button and the Q, −I, [U.V.] 100% luminance white and black bars at the bottom of the color pattern disappear and the color bars at the top appear to form a full field color bar. By pressing the button once again, a split color bar with the Q, −I [U.V.], white and black signals is displayed and the green lamp goes off.

> **Note:**
> The above buttons (15 ~ 17) have no effects on patterns other than color bars.

18. COLOR

With this button pressed, color bars appear on top of the pattern, and the Q, −I [U.V.], white and black signals at the bottom. The color bars (NTSC [PAL] system) are used for testing and adjusting color or black/white TV receivers, VTR's and other video equipment.

19. RASTER

By pressing this button, a raster appears on the screen. The red, blue, green and white signal can be selected by the raster selector switch (6).

20. DOT

By pressing this button, white dots appear on the black background of 15 x 20.

21. CENTER CROSS

By pressing this button, a white center cross appears on the black background of 1 × 1.

22. CROSS HATCH

By pressing this button, a white square cross hatch with a center dot appears on the black background of 20 × 16 [16 × 20].

Note:
The touch-buttons function when touched lightly.
The touch-buttons (18 ~ 22) are interlocked. When one button is depressed, any other button being pressed will be released.
When the buttons (15 ~ 22) are pressed, the LED's (red for 18 ~ 22) and green for (15 ~ 17) above the buttons will light.

REAR AND SIDE PANEL

23. Handle

Carrying handle.

24. Cord Reel

Wrap the power cord around the cord reels when the unit needs to be transported or it is not in use.

25. Channel Indication Sheet

The A and B of the RF channel are factory set to the values specified on the channel name plate.

26. Line Voltage Indication Sheet

Set to the specified voltage and use the specified fuse.

27. Fuse Holder

The fuse is able to be removed from the unit, by rotating this holder counterclockwise with a suitable ⊕ screwdriver. Use the specified fuse.

28. Power Connector

AC voltage input connector. Use the specified AC power cord.

29. AC Voltage Selector

Set to the specified voltage after disconnecting the AC power cord from the AC outlet.

30. SUB CARRIER

Square wave output of color sub-carrier is available at this terminal. The output impedance is 75 ohms and the output level is approx. 1V p-p (open circuit).

31. CONT. INPUT

Used to connect the remote controller RT62. The CONT. INPUT amphenol connector (24-pin) is only provided in the [T] type. In the other types, blind plate is attached.

32. SUB CARRIER Frequency Adjustment

Sub-carrier frequency is adjustable within the range of ±5 Hz.

33. RF Frequency Adjustment

Screwdriver adjustment for RF Frequency. The front panel side is CH A and the other is CHB.

OPERATION

PRELIMINARILY OPERATION

Connect the power cord to the proper power line. Press the power switch (1) and the power LED will light to indicate that the power is ON.
The light of all LEDs above the touch-buttons will go off.
The [T] type model, controlled by the remote controller RT-62, is automatically set to the selected mode by the RT-62.

CONNECTION TO TV RECEIVER

Before connecting the unit to a TV receiver, the following points should be proceeded (see Fig. 3):

1. Disconnect the antenna feeder or coaxial cable from the TV receiver.
2. Check the antenna impedance.
3. Make sure that high voltage or AC power is not leaking to the antenna terminal. If a leakage is apparent, connect an appropriate capacitor (10 ~ 1000 pF).

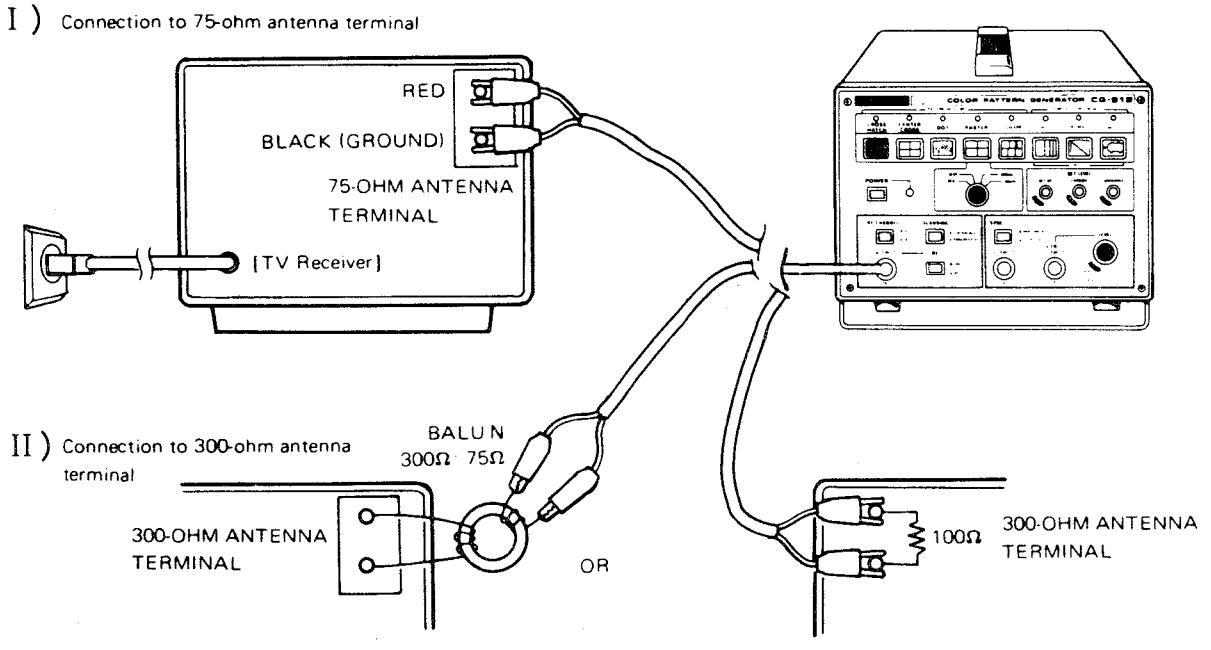


Fig. 3 Connection to TV Receiver

PATTERN OPERATION

1. Cross Hatch

The center dot is used for adjusting the static convergence of color picture tube. The cross hatch is used for adjusting the dynamic convergence; also, used for raster alignments such as vertical and horizontal amplitudes and linearity.

2. Center Cross

Used for adjusting the vertical and horizontal positions on picture tube.

3. Dot

Used for adjusting the static convergence and focus of picture tube.

4. Raster

The red, blue and green rasters are used for checking and adjusting the purity of color picture tube.

5. Color Bar

a) Split color bar (Color selector switch should be in ON position)
Used for adjusting CHROMA and ACC (automatic color control) circuits of TV receiver; also, used for setting the chroma and ACC levels of VTR or for setting the chroma level balance and burst gate (amplitude, phase, etc.).

b) Full field color bar (Depress color selector I.Q.W. [U.V.W.] OFF switch)
This is used when Q, −I [U.V.] and white signals are not required for the adjustments in item (a) above.

c) Gray scale (Depress color selector CHROMA. OFF switch)
Gray scale pattern is obtained by eliminating the chrominance component from the color bar signal so that only the luminance component is retained in the signal. Use this pattern for checking and adjusting the video linearity and white balance of TV receiver, VTR, etc.

d) Chroma signal (Depress the color slector LUMI. OFF switch)
A pattern with chrominance component only. The luminance component is removed from the color bar.

Using this pattern, it is possible to check the level of chroma signal from the video amplifier circuit and changes in the phase of the signal.

SELECTION OF RF CHANNELS (only CG-911A)

The "A" of RF CH on the front panel is CH5 USA (77.25 MHz) and the "B" is CH6 USA (83.25 MHz).
If desired, the "A" can be switched to CH2 Japan (97.25 MHz) and the "B" to CH3 Japan (103.25 MHz) by using the channel selector switch as shown in the illustration below, thus permitting adjustments of both the USA and Japanese channel TV receivers.
To change the channel frequencies, remove the bottom case and select the position of the selector switch shown by an arrow mark.
Set the switch to "M" for USA CH, and to "JA" for Japanese CH.

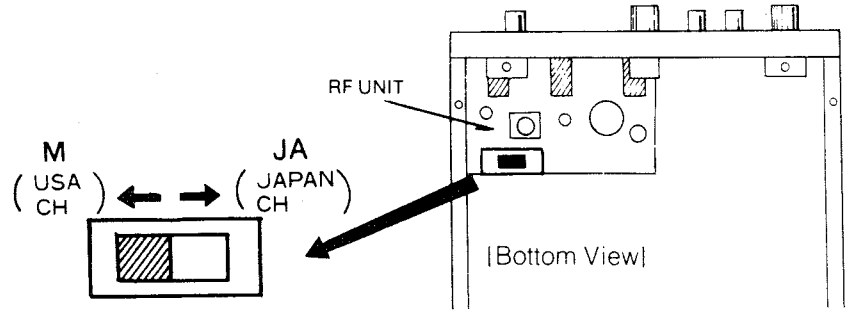


Fig. 4 Selection of RF Channels (CG-911A)

REMOTE CONTROL OPERATION (T type only)

With the remote controller RT-62 (option), the unit can be remotely controlled. All pattern can be obtained by changing the step button (1 ~ 16).
For details, refer to the RT-62 Instruction Manual.

Control signal

Remote selection

Panel	H
Remote	L

Remote control

Control enable	L
Control disable	H

Pattern selection

RT-62 Pin No.	Control signal				Pattern signal combination
	A	B	C	D	
1	L	H	H	H	①
2	H	L	H	H	②
3	L	L	H	H	③
4	H	H	L	H	④
5	L	H	L	H	⑤
6	H	L	L	H	⑥
7	L	L	L	H	⑦
8	H	H	H	L	⑧

RT-62 Pin No.	Control signal				Pattern signal combination
	A	B	C	D	
9	L	H	H	L	⑧ + ⑪
10	H	L	H	L	⑧ + ⑩
11	L	L	H	L	⑧ + ⑩ + ⑪
12	H	H	L	L	⑧ + ⑨
13	L	H	L	L	⑧ + ⑨ + ⑪
14	H	L	L	L	⑧ + ⑨ + ⑩
15	L	L	L	L	⑧ + ⑨ + ⑩ + ⑪
16	H	H	H	H	

Connection of pin connector

Pin No.	Signal	Pin No.	Signal
1	A	6	Remote control
2	B	10	Remote selection
3	C	11	GND
4	D	12	+5V

① CROSS HATCH
② CENTER CROSS
③ DOT
④ RASTER – R
⑤ RASTER – G
⑥ RASTER – B
⑦ RASTER – W
⑧ COLOR
⑨ I.Q.W. [U.V.W.] OFF
⑩ CHROMA OFF
⑪ LUMI OFF

Note: The "+5V" in the table is the LED drive voltage (10 mA) of RT-62.

PRECAUTIONS

1. Do not expose the unit to direct sunlight, as it can result in damage to the transistors, ICs and other parts.

2. Do not use the unit in locations subjected to high temperature and humidity.

3. Do not use the unit in locations subjected to excessive vibration, as it causes misoperation of the unit.

4. Use the rated AC power voltage (±10%) of 50/60 Hz.

5. Do not connect external voltage to any output terminal (RF, SYNC, VIDEO and SUB CAR OUTPUT).

6. To prevent electric shock, make sure to disconnect the power cord of TV receiver before connecting the unit.

7. Touch-buttons function by pressing lightly at the center.

8. Always set the RF channels to the channels of TV receiver.

MAINTENANCE AND ADJUSTMENT

MAINTENANCE

Removal of Case

1. Remove the two screws from the top, four screws from the left and right sides and four screws from the bottom, using a Phillips type screwdriver.
2. Pull the upper case up and the lower case-down.

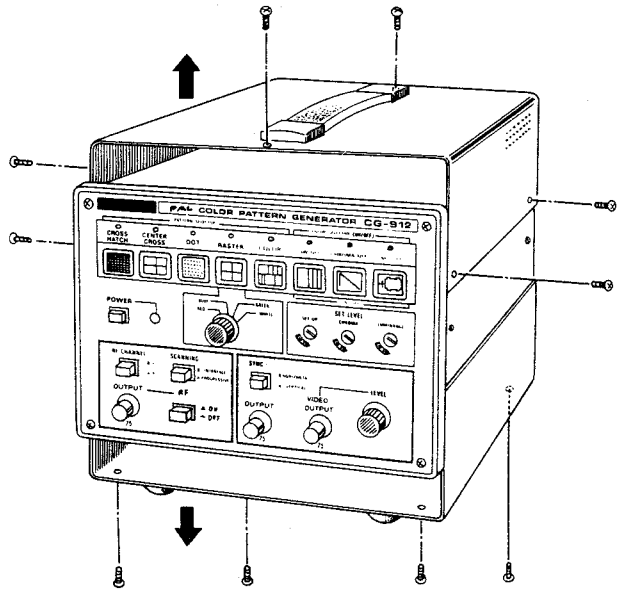


Fig. 5 Removal of Case

Selection of Power Voltage

When operating on 100V, 120V or 220V, set the voltage selector switch on the rear panel to the correct position.

For operation on 100V or 120V, take out the fuse (0.3A) in the fuse holder on the rear panel, and replace it with a 0.7A fuse.

Note:

When changing the power voltage, be sure to remove the power cord from the AC outlet.

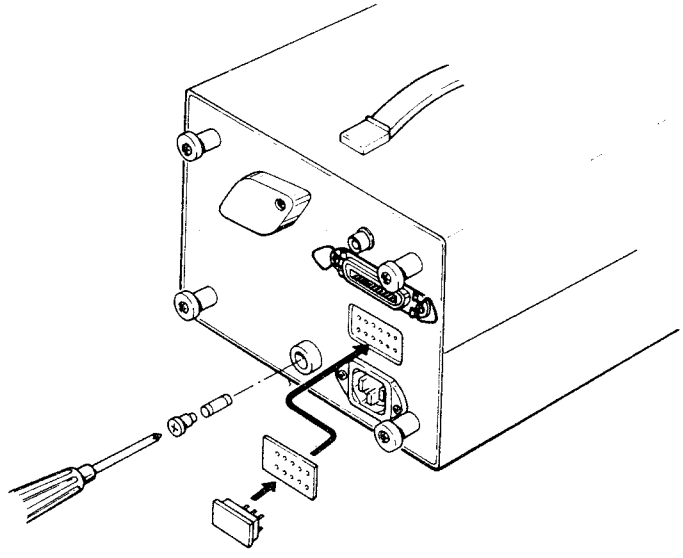


Fig. 6 Voltage Conversion

ADJUSTMENT

Check of Composite Video Signal

Use an oscilloscope for observation of color video signals.

1. The oscilloscope to be used should be capable of triggering and measuring signals of more than 10 MHz (KENWOOD'S CS-1566A, 1820, etc.)
2. Connect the oscilloscope vertical input to the video output of the unit via a 75-ohm terminator. Set the oscilloscope in DC input mode.
4. Set the pattern selector switch to COLOR.
5. If the oscilloscope is not provided with TV sync. function or it cannot be synchronized with the horizontal sync. signal of the unit, connect the sync signal output of the unit to the external sync. input of the oscilloscope.
6. Color video signals displayed on the oscilloscope are shown in Fig. 9.

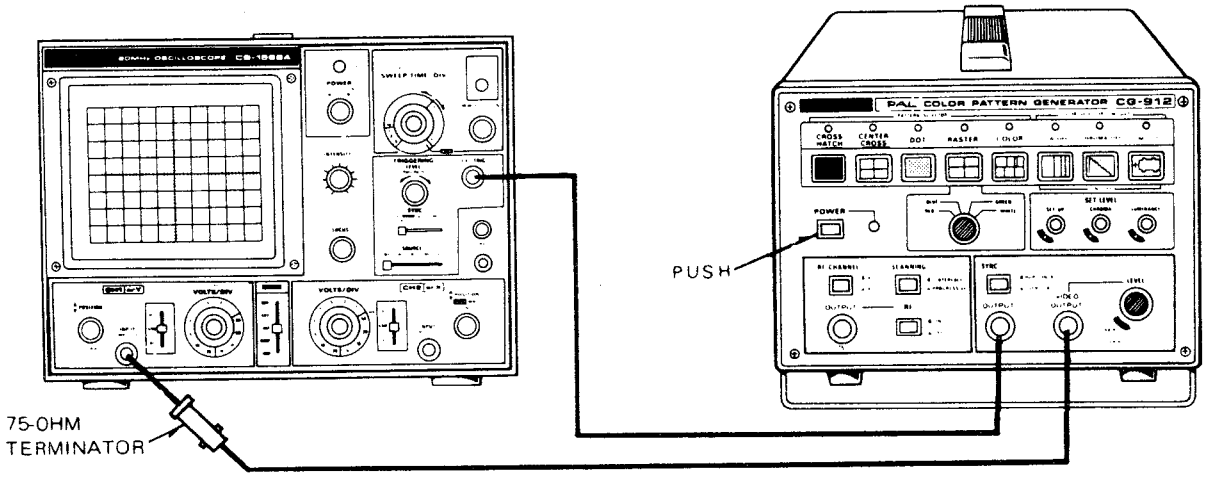


Fig. 7 Connection of Oscilloscope to CG-911A (CG-912)

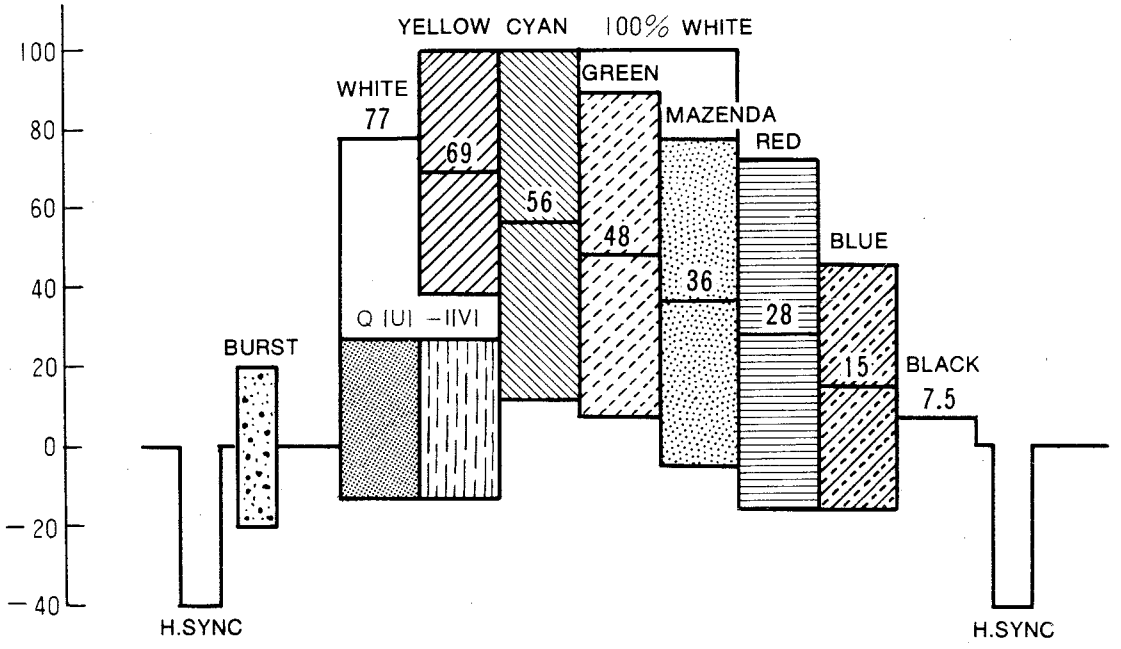


Fig. 8 Color Patterns Observed by Oscilloscope

Adjustment of Set Level

After connecting the oscilloscope to the unit, make sure that the VIDEO LEVEL of the unit is set to CAL and the video output is connected through a 75-ohm terminator to the oscilloscope input.

While observing the patterns on the oscilloscope, adjust the SET UP control (12) to the desired level and the LUMINANCE control (14) for 1V p-p of video signal wave height (from H. SYNC to 100% white). Then, adjust the CHROMA control (13) until the maximum level of the yellow and cyan signals becomes equal to the level of the 100% white signal as shown in Fig. 8. The patterns shown in Fig. 8 are the waveforms of color bar signal set to 7.5%.

(The numbers in parentheses given after the adjusting controls are referred to Fig. 1.)

Sub-Carrier Frequency Adjustment

Connect a frequency counter to the SUB-CARRIER terminal at the rearpanel.

Adjust the sub-carrier frequency ±5Hz using a well insulated screwdriver. Do not use the metallic screwdriver.

Other Adjustments

For adjustments which require measuring instruments other than oscilloscope, contact the KENWOOD'S dealer.

MAIN CHASSIS

Schematic Symbol	Parts No.	Description
	A01-0851-13	Case(top)
	A01-0852-13	Case(bottom)
	A20-2748-42	Die casting panel
	A23-1626-23	Rear panel
	A21-0862-43	Decorative panel
	[A21-0881-13	Decorative panel]
	B39-0407-04	Spacer
	B07-0703-04	Push escutcheon(round type, grey)
	B07-0706-04	Push escutcheon
	B40-2765-04	Name plate(Model)
	B41-0701-14	Voltage indication plate
	B50-2929-40	Instruction manual
	B40-0765-14	Name plate(serial)
	B42-1819-04	Channel indication plate(Japan)
	B42-1820-04	Channel indication plate(USA)
	[B42-1869-04	Channel indication plate](Argentina)
	[B42-1870-04	Channel indication plate](Brazilian)
	[B42-1830-04	Channel indication plate](West European)
	[B42-1831-04	Channel indication plate](Italian)
	[B42-1832-14	Channel indication plate](Australian)
	[B42-1833-04	Channel indication plate](New Zealand)
	E09-0681-05	Voltage selector (plug)
	E08-1081-05	Voltage selector (Jack)
	E18-0351-05	Power connector
	E30-1818-05	Power cord(JIS)
	E04-0251-05	BNC receptacle
	E02-1031-08	Transistor socket
	F19-0703-04	Voltage selector plate
	F15-0703-04	Blind plate
	F19-0707-04	Spacer(for push knob)
	F07-0916-08	Transistor cover
	H25-0029-04	Polyethylene bag

Schematic Symbol	Parts No.	Description
	H20-0347-04	Protective cover
	H01-2887-44	Packing case(cartoarton)
	H10-2802-02	Pad(foamed styrene)
	J21-2897-24	Bracket(for LED)
	J21-2898-04	Bracket(for VR)
	J02-0323-05	Rubber leg
	J42-0510-04	Rubber bushing
	J02-0407-04	Auxiliary foot
	J21-2573-04	Mountng hardware(for auxiliary foot)
	J42-0038-04	Bushing(for adjustment)
	J30-0609-14	Spacer(for push knob)
	J30-0613-13	Spacer(for push knob)
	J13-0033-15	Fuse holder
	J21-2953-04	Bracket(for PCB)
	K01-0058-25	Handle
	K21-0820-04	Knob
	K27-0505-04	Push knob(blue)
	K27-0506-04	Push knob(orange)
	K27-0514-04	Push knob(CROSS HATCH)
	K27-0515-04	Push knob(CENTER CROSS)
	K27-0516-04	Push knob(DOT)
	K27-0517-04	Push knob(RASTER)
	K27-0518-04	Push knob(COLOR)
	K27-0519-04	Push knob IQW [UVW]
	K27-0520-04	Push knob(CHROMA)
	K27-0521-04	Push knob(LUM)
	L01-9216-08	Power transformer
S4	S01-1511-08	Rotary switch(RASTER)
	W01-0058-04	Cord wrap
	AR-5134S	LED
	2SD428	Transistor

Schematic Symbol	Parts No.	Description
	X71-1080-00	Generator unit
	[X71-1050-00]	RF unit (PAL B,M,N)]
	X73-1290-00	RF unit (NTSC)
	S40-1503-08	Push switch (RF ON/OFF)
	S40-2514-05	Push switch (POWER ON/OFF)
	S42-3505-08	Push switch (RF CH SYNC SCAN)

GENERATOR UNIT(X71-1080-00)

Schematic Symbol	Parts No.	Description			
R1,2	RD14BB2E221J	Carbon res	220Ω	±5%	1/4W
R3	RD14BB2E472J	Carbon res	4.7kΩ	±5%	1/4W
R4	RD14BB2E271J	Carbon res	270Ω	±5%	1/4W
R5	RD14BB2E101J	Carbon res	100Ω	±5%	1/4W
R6,7	RD14BB2E472J	Carbon res	4.7kΩ	±5%	1/4W
R8	RD14BB2E361J	Carbon res	360Ω	±5%	1/4W
R9	RD14BB2E910J	Carbon res	91Ω	±5%	1/4W
R10	RD14BB2E122J	Carbon res	1.2kΩ	±5%	1/4W
R11	RD14BB2E391J	Carbon res	390Ω	±5%	1/4W
R12,13	RD14BB2E152J	Carbon res	1.5kΩ	±5%	1/4W
R14	RD14BB2E332J	Carbon res	3.3kΩ	±5%	1/4W
R15	RD14BB2E472J	Carbon res	4.7kΩ	±5%	1/4W
R16	RD14BB2E104J	Carbon res	100kΩ	±5%	1/4W
R17	RD14BB2E103J	Carbon res	10kΩ	±5%	1/4W
R18	RD14BB2E472J	Carbon res	4.7kΩ	±5%	1/4W
R19,20	RD14BB2E271J	Carbon res	270Ω	±5%	1/4W
R21	RD14BB2E471J	Carbon res	470Ω	±5%	1/4W
R22	RD14BB2E152J	Carbon res	1.5kΩ	±5%	1/4W
R23	RD14BB2E182J	Carbon res	1.8kΩ	±5%	1/4W
R24	RD14BB2E472J	Carbon res	4.7kΩ	±5%	1/4W
R25	RD14BB2E622J	Carbon res	6.2kΩ	±5%	1/4W
R26	RD14BB2E682J	Carbon res	6.8kΩ	±5%	1/4W
R27	RD14BB2E101J	Carbon res	100Ω	±5%	1/4W
R28	RD14BB2E102J	Carbon res	1kΩ	±5%	1/4W
R29	RD14BB2E511J	Carbon res	510Ω	±5%	1/4W
R30	RD14BB2E152J	Carbon res	1.5kΩ	±5%	1/4W
R31	RD14BB2E222J	Carbon res	2.2kΩ	±5%	1/4W
R32	RD14BB2E911J	Carbon res	910Ω	±5%	1/4W
R33	No use				
R34	RD14BB2E681J	Carbon res	680Ω	±5%	1/4W
R35	RD14BB2E332J	Carbon res	3.3kΩ	±5%	1/4W
R36	RD14BB2E221J	Carbon res	220Ω	±5%	1/4W
R37,38	RD14BB2E101J	Carbon res	100Ω	±5%	1/4W
R39	RD14BB2E102J	Carbon res	1kΩ	±5%	1/4W
R40	RD14BB2E101J	Carbon res	100Ω	±5%	1/4W
R41	RD14BB2E102J	Carbon res	1kΩ	±5%	1/4W
R42	RD14BB2E101J	Carbon res	100Ω	±5%	1/4W
R43	RD14BB2E100J	Carbon res	10Ω	±5%	1/4W
R44	RD14BB2E472J	Carbon res	4.7kΩ	±5%	1/4W
R45,46	RD14BB2E101J	Carbon res	100Ω	±5%	1/4W
R47,48	RD14BB2E151J	Carbon res	150Ω	±5%	1/4W
R49,50	RD14BB2E101J	Carbon res	100Ω	±5%	1/4W
R51	RD14BB2E472J	Carbon res	4.7kΩ	±5%	1/4W
R52	RD14BB2E103J	Carbon res	10kΩ	±5%	1/4W
R53	No use				
R54,55	RD14BB2H152J	Carbon res	1.5kΩ	±5%	1/2W
R56-63	RD14BB2E391J	Carbon res	390Ω	±5%	1/4W
R64	RD14BB2E103J	Carbon res	10kΩ	±5%	1/4W
R65	NO use				
R66,67	RD14BB2E103J	Carbon res	10kΩ	±5%	1/4W
R68	RD14BB2E472J	Carbon res	4.7kΩ	±5%	1/4W
R69～71	RD14BB2E103J	Carbon res	10kΩ	±5%	1/4W

Schematic Symbol	Parts No.	Description			
R72	RD14BB2E102J	Carbon res	1kΩ	±5%	1/4W
R73	RD14BB2E152J	Carbon res	1.5kΩ	±5%	1/4W
R74	RD14BB2E472J	Carbon res	4.7kΩ	±5%	1/4W
R75-77	RD14BB2E103J	Carbon res	10kΩ	±5%	1/4W
R78-81	RD14BB2E104J	Carbon res	100kΩ	±5%	1/4W
R82	RD14BB2E152J	Carbon res	1.5kΩ	±5%	1/4W
R83	RD14BB2E472J	Carbon res	4.7kΩ	±5%	1/4W
R84	RD14BB2H181J	Carbon res	180Ω	±5%	1/2W
R85	RD14BB2E822J	Carbon res	8.2kΩ	±5%	1/4W
R86	RD14BB2E222J	Carbon res	2.2kΩ	±5%	1/4W
R87	RD14BB2E103J	Carbon res	10kΩ	±5%	1/4W
R88	No use			±5%	1/4W
R89	RD14BB2E622J	Carbon res	6.2kΩ	±5%	1/4W
R90	RD14BB2E222J	Carbon res	2.2kΩ	±5%	1/4W
R91	RD14BB2E242J	Carbon res	2.4kΩ	±5%	1/4W
R92	RD14BB2E332J	Carbon res	3.3kΩ	±5%	1/4W
R93	RD14BB2E152J	Carbon res	2.2kΩ	±5%	1/4W
R94,95	RD14BB2E512J	Carbon res	5.1kΩ	±5%	1/4W
R97, 98	RD14BB2E472J	Carbon res	4.7kΩ	±5%	1/4W
R99	RD14BB2E101J	Carbon res	100Ω	±5%	1/4W
R100	RD14BB2E152J	Carbon res	1.5kΩ	±5%	1/4W
R101	RN14BK2E4872F	Metal film res	48.7kΩ	±1%	1/4W
R102	RN14BK2E8251F	Metal film res	8.25kΩ	±1%	1/4W
R103	RN14BK2E1622F	Metal film res	16.2kΩ	±1%	1/4W
R104	RN14BK2E1212F	Metal film res	12.1kΩ	±1%	1/4W
R105	RN14BK2E3922F	Metal film res	39.2kΩ	±1%	1/4W
R106	RN14BK2E3651F	Metal film res	3.65kΩ	±1%	1/4W
R107	RN14BK2E2552F	Metal film res	25.5kΩ	±1%	1/4W
	(3882F)	[PAL]	38.3kΩ	±5%	1/4W
R108	RN14BK2E3832F	Metal film res	38.3kΩ	±1%	1/4W
R109	RN14BK2E3012F	Metal film res	30.1kΩ	±1%	1/4W
		[PAL No use]			

Schematic Symbol	Parts No.	Description			
R110	RN14BK2E4752F	Metal film res	47.5kΩ	±1%	1/4W
R111	RN14BK2E3012F	Metal film res	30.1kΩ	±1%	1/4W
[R111	RN14BK2E2672F	Metal film res	26.7kΩ	±1%	1/4W]
R112	RN14BK2E4752F	Metal film res	47.5kΩ	±1%	1/4W
[R112	RN14BK2E2672F	Metal film res	26.7kΩ	±1%	1/4W]
R113	RN14BK2E3402F	Metal film res	34kΩ	±1%	1/4W
R114	RN14BK2E7501F	Metal film res	7.5kΩ	±1%	1/4W
R115	RN14BK2E6341F	Metal film res	6.34kΩ	±1%	1/4W
R116	RN14BK2E1132F	Metal film res	11.3kΩ	±1%	1/4W
R117	RN14BK2E2262F	Metal film res	22.6kΩ	±1%	1/4W
R118	RN14BK2E5361F	Metal film res	5.36kΩ	±1%	1/4W
R119,120	No use				
R121,122	RN14BK2E43ROF	Metal film res	43Ω	±1%	1/4W
R123-134	RN14BK2E1001F	Metal film res	1kΩ	±1%	1/4W
R135-138	RN14BK2E1003F	Metal film res	100kΩ	±1%	1/4W
R139,140	RN14BK2E5361F	Metal film res	5.36kΩ	±1%	1/4W
R141	RD14BB2E182J	Ceramic cap	1.8kΩ	±5%	1/4W
R142	RD14BB2E101J	Ceramic cap	100Ω	±5%	1/4W
R143,144	RN14BK2E43ROF	Metal film res	43Ω	±1%	1/4W
VR1,2	R12-3505-05	Semi-fixed res	33kΩB		
VR3	R12-0003-05	Semi-fixed res	470ΩB		
VR4	R12-3002-05	Semi-fixed res	10kΩB		
VR5-7	R01-2512-08	Variable resistor	5kΩB		
VR8	R03-1505-08	Variable resistor	1kΩB		
C1,2	CE04W1C102M	Electrolytic Cap	1000μF		16WV
C3	CE04W1C331M	Electrolytic Cap	330μF		16WV
C4,5	CE04W1E471M	Electrolytic Cap	470μF		25WV
C6	CE04W1C222M	Electrolytic Cap	2200μF		16WV
C7-9	CE04W1H010M	Electrolytic Cap	1μF		50WV
C10	CE04W1C100M	Electrolytic Cap	10μF		16WV
C11-26	CE04W1C470M	Electrolytic Cap	47μF		16WV
C27	CK45B1H103K	Ceramic cap	0.01μF	±10%	50WV
C28-31	CM93D1H220K	Mica cap	22pF	±10%	50WV

Schematic Symbol	Parts No.	Description
C32,33	CK45B1H103K	Ceramic cap 0.01μF ±10% 50WV
C34,35	CQ93D1H680K	Mica cap 68pF ±10% 50WV
C36	CC45CH1H471J	Ceramic cap 470pF ±5% 50WV
C37-39	CK45B1H103K	Ceramic cap 0.01μF ±10% 50WV
C40	CC45CH1H471J	Ceramic cap 470pF ±5% 50WV
C41	CK45B1H561K	Ceramic cap 560pF ±10% 50WV
C42	CK45B1H102K	Ceramic cap 1000pF ±10% 50WV
C43-56	CK45B1H103K	Ceramic cap 0.01μF ±10% 50WV
C57	CQ93D1H101K	Mica cap 100pF ±10% 50WV
C58	CE04W1C100M	Electrolytic Cap 10μF 16WV
C59	CE04W1C470M	Electrolytic Cap 47μF 16WV (PAL-B,M.NTSC)
C60,61	CC45SL1H150J	Ceramic cap 15pF ±5% 50WV (PAL-M,N)
[C60,61	CC45SL1H220J	Ceramic cap 22pF ±5% 50WV] (PAL-B)
C60,61	CC45SL1H200J	Ceramic cap 20pF ±5% 50WV (NTSC)
C62	CK45B1H203K	Ceramic cap 0.02μF ±10% 50WV
C63	CQ93D1H101K	Mica 100pF ±10% 50WV
C64	CQ93D1H680K	Mica 68pF ±10% 50WV
TC1	C05-0419-08	Ceramic trimmer 40pF
L1	L40-2201-44	Ferri Inductor 22μH
L2,3	L40-3301-44	Ferri Inductor 33μH
L4	L40-7501-44	Ferri Inductor 75μH
X1	L77-1001-05	Crystal resonator HC18/U 14.31818MHz
[X1	L77-1008-05	Crystal resonator HC18/U [PAL-N] 14.328224MHz]
[X1	L77-1009-05	Crystal resonator HC18/U [PAL-M] 14.302444MHz]

Schematic Symbol	Parts No.	Description
[X1	L77-1006-05	Crystal resonator HC18/U [PAL-B] 17.734476MHz]
D1-42 (40)	1S1588	Diode
D43-46	U0-5B	Diode
D47-54	10D-1	Diode
D55-57	PG4133S	LED
D58-62	AR4113S	LED
D63	AR5134S	LED
D64,65	1S1588	Diode
Q1-19 (18)	2SA1015(Y)	Transistor
Q20-22	2SC1815(Y)	Transistor
Q23	2SA1015(Y)	Transistor
Q24	2SC1815(Y)	Transistor
Q25	2SA1015(Y)	Transistor
Q26-29	2SC1815(Y)	Transistor
Q30	2SA496	Transistor
Q31	2SA1015(Y)	Transistor
Q32	2SC496	Transistor
Q33-35	2SC1815(Y)	Transistor
Q36	2SA1015(Y)	Transistor
Q37	2SC1815(Y)	Transistor
Q38-40	2SA1015(Y)	Transistor
IC1	SN74LS93	IC
IC2,3	SN74LS92	IC
IC4	SN74LS73	IC
IC5	SN74LS90	IC
IC6	SN74LS92	IC
IC7	SN74LS93	IC
IC8	SN74S04	IC
IC9	SN74LS04	IC
IC10	SN74LS20	IC
IC11,12	SN74LS74	IC

Schematic Symbol	Parts No.	Description
IC13	SN74LS27	IC
IC14	SN7408	IC
IC15	SN74LS00	IC
IC16	SN74LS20	IC
IC17	SN74S112	IC
IC18	SN74LS27	IC
IC19	SN74LS74	IC
IC20	SN74LS00	IC
IC21	SN74LS42	IC
IC22,23	SN74LS02	IC
IC24,25	SN74LS00	IC
IC26	SN74S112	IC
IC27	SN7475	IC
IC28	SN74LS74	IC
IC29	SN74LS73	IC
IC30	SN74LS10	IC
IC31	SN74LS00	IC
IC32	SN74LS02	IC
IC33	SN74LS04	IC
IC34	SN74LS74	IC
IC35	SN74LS86	IC
IC36,37	SN74LS123	IC
IC38	SN74LS32	IC
IC39	SN74LS02	IC
IC40	SN74LS00	IC
IC41,42	SN74LS03	IC
IC43	SN7475	IC
IC44	SN74LS32	IC
IC45	SN74LS08	IC
IC46	SN74LS00	IC
IC47,48	SN74LS74	IC
IC49,50	MC1496	IC
IC51	MC7805	IC
IC52,53	MC7812	IC
	E40-1515-05	Connector 15P
	E40-1015-05	Connector 10P
	E40-0815-05	Connector 8P
T10-32	E23-0517-08	Output terminal
	E29-0518-05	Leadwire/connector
	J25-2962-08	Printed circuit board

RF UNIT(X73-1290-00)

Schematic Symbol	Parts No.	Description
R1	RD14BB2E333J	Carbon res 33kΩ ±5% 1/4W
R2	RD14BB2E332J	Carbon res 3.3kΩ ±5% 1/4W
R3	RD14BB2E222J	Carbon res 2.2kΩ ±5% 1/4W
R4	RD14BB2E332J	Carbon res 3.3kΩ ±5% 1/4W
R5,6	RD14BB2E102J	Carbon res 1kΩ ±5% 1/4W
R7	RD14BB2E101J	Carbon res 100Ω ±5% 1/4W
R8	RD14BB2E131J	Carbon res 130Ω ±5% 1/4W
R9	RD14BB2E102J	Carbon res 1kΩ ±5% 1/4W
R10	RD14BB2E471J	Carbon res 470Ω ±5% 1/4W
R11,12	RD14BB2E511J	Carbon res 510Ω ±5% 1/4W
R13,14	RD14BB2E103J	Carbon res 10kΩ ±5% 1/4W
R15	RD14BB2E122J	Carbon res 1.2kΩ ±5% 1/4W
VR1	R12-1002-05	Variable res 1kΩB
C1	CC45CH1H050C	Ceramic cap 5pF ±0.25pF 50WV
C2	CK45F1H104Z	Ceramic cap 0.1μF +80% −20% 50WV
C3	CK45F1H103Z	Ceramic cap 0.01μF +80% −20% 50WV
C4	CK45F1H102P	Ceramic cap 1000pF +100% − 0% 50WV
C5	CC45CH1H100D	Ceramic cap 10pF ±0.5pF 50WV
C6	CC45CH1H330J	Ceramic cap 33pF ±5% 50WV

Schematic Symbol	Parts No.	Description
C7	CM93D1H220J	Mica cap 22pF ±5% 50WV
C8	CM93D1H680J	Mica cap 68pF ±5% 50WV
C9	No use	
C10	CC45CH1H100J	Ceramic cap 10pF ±5% 50WV
C11	CE04W1C470M	Electrolytic cap 47μF 16WV
C12,13	CK45F1H103Z	Ceramic cap 0.01μF +80% −20% 50WV
C14,15	No use	
C16	CK45F1H103Z	Ceramic cap 0.01μF +80% −20% 50WV
TC1,2	C05-0013-04	Ceramic trimmer 10pF
TC3	C05-0309-05	Ceramic trimmer 40pF
D1	1S1588	Diode
Q23-25	2SC2347(Y)	Transistor
Q26	2SA1015(Y)	Transistor
Q27,28	2SC2347(Y)	Transistor
L1	L32-0802-08	Coil 75μH
S1	S31-2503-08	Slide switch JA/US
	J25-2870-08	Printed circuit board

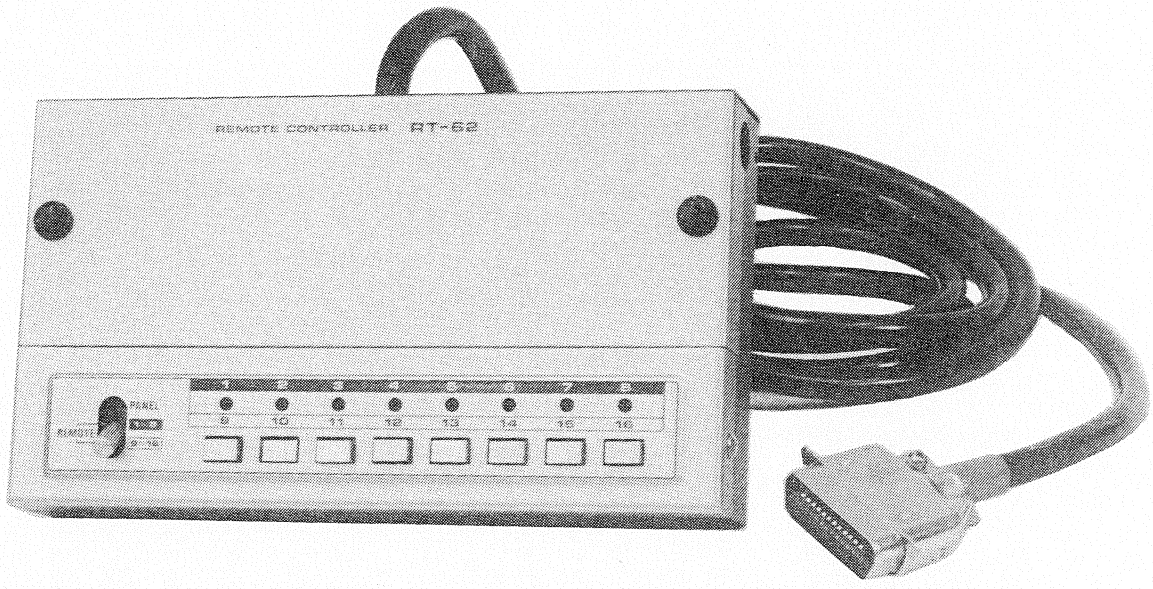
RF UNIT (X71-1050-00) PAL

Schematic Symbol	Parts No.	Description
R83	RD14BB2E103J	Carbon res 10kΩ ±5% 1/4W
R84	RD14BB2E512J	Carbon res 5.1kΩ ±5% 1/4W
R85	RD12BB2E511J	Carbon res 510Ω ±5% 1/4W
R86	RD14BB2E222J	Carbon res 2.2kΩ ±5% 1/4W
R87	RD14BB2E472J	Carbon res 4.7kΩ ±5% 1/4W
R88,89	RD14BB2E104J	Carbon res 100kΩ ±5% 1/4W
R90	RD14BB2E102J	Carbon res 1kΩ ±5% 1/4W
R91	RD14BB2E511J	Carbon res 510Ω ±5% 1/4W
R92	RD14BB2E131J	Carbon res 130Ω ±5% 1/4W
R93	RD14BB2E101J	Carbon res 100Ω ±5% 1/4W
R94	RD14BB2E332J	Carbon res 3.3kΩ ±5% 3.3kΩ
R95	RD14BB2E102J	Carbon res 1kΩ ±5% 1/4W
R96	RD14BB2E222J	Carbon res 2.2kΩ ±5% 1/4W
R97	RD14BB2E332J	Carbon res 3.3kΩ ±5% 1/4W
R98	RD14BB2E333J	Carbon res 33kΩ ±5% 1/4W
VR9	R12-1002-05	Semi-fixed res 1kΩB
C39	CK45F1H104Z	Ceramic cap 0.1μF +80% −20% 50WV
C40	CE04W1C470M	Electrolytic cap 47μF 16WV
C41	No use	
C42	CK45E1H102P	Ceramic cap 1000pF +100% −0% 50WV
C43	CK45F1H103Z	Ceramic cap 0.01μF +80% −20% 50WV
C44	CC45CH1H050C	Ceramkic cap 5pF ±0.25pF 50WV
C45	CC45CH1H100D	Ceramic cap 10pF ±0.5pF 50WV
C46	CC45CH1H020C	Ceramic cap 2pF ±0.25pF 50WV
C47,48	CK45E1H102P	Ceramic cap 1000pF +100% −0% 50WV
C49	CM93D1H220J	MKica cap 22pF ±5% 50WV
C50-52	CK45F1H103Z	Ceramic cap 0.01μF +80% −20% 50WV
C53	CC45CH1H050C	Ceramic cap 5pF ±0.25pF 50WV
C54	CC45SL1H150J	Ceramic cap 15pF ±5% 50WV
TC1,2	C05-0010-05	Ceramic trimmer 10pF
D59	1S1588	Diode
Q38-40	2SC1815(Y)	Transistor
Q41,42	2SC2347(Y)	Transistor
Q43	2SA1015(Y)	Transistor
L4	L32-0802-08	Coil 75μH
L5	L40-2201-03	Ferri inductor 22μF
	J25-2892-08	Printed circuit board

OPTION

RT-62 (REMOTE CONTROLLER)

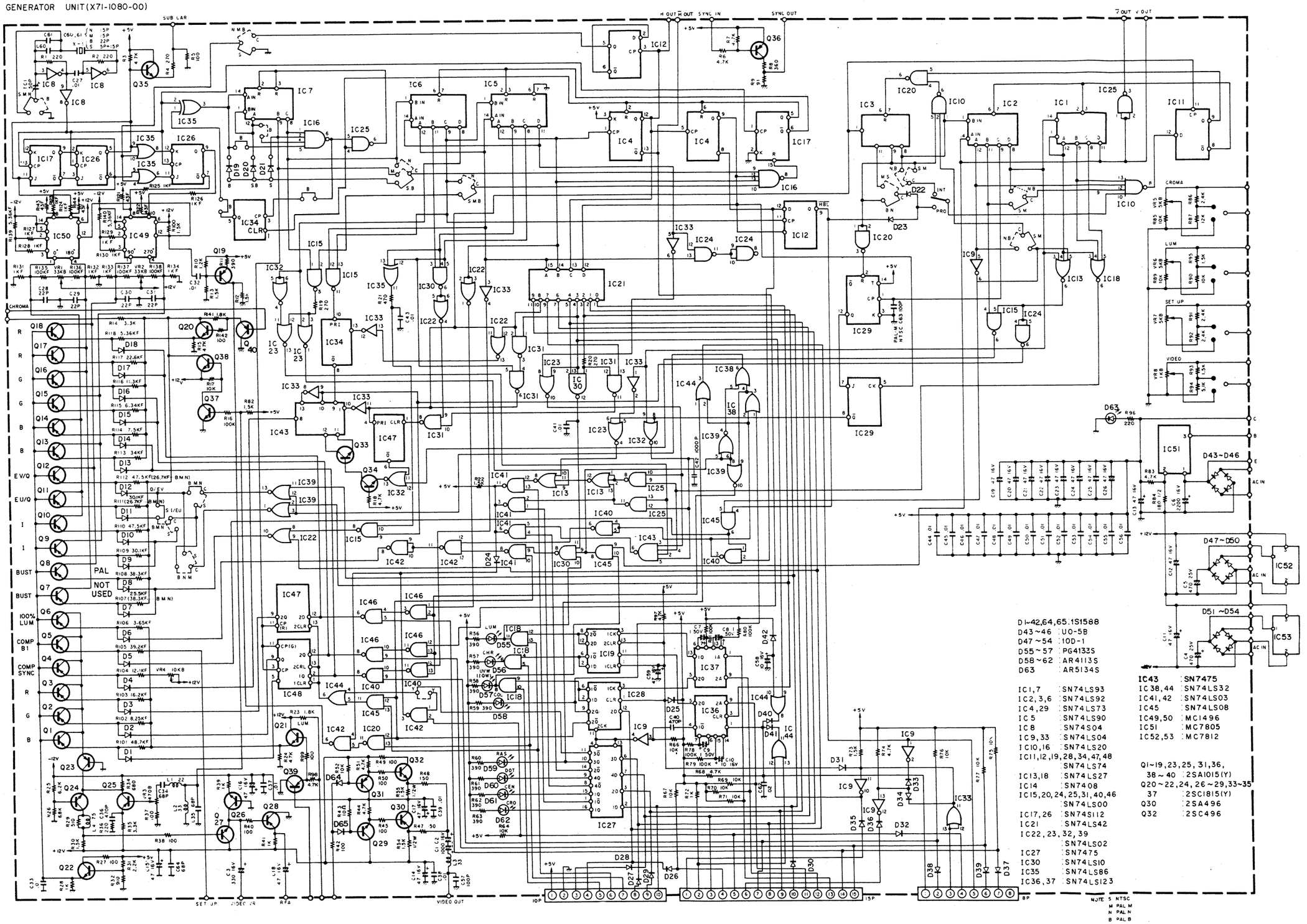
This is a remote controller which enable the operator to control the measuring instrument located at a distance from it. This unit contains two control systems which use 4-bit binary signals and is able to program 16 ranges and modes up to eight steps separately and one control system up to 16 steps arbitrarily and to make a switchover by the operation of the pushbutton switching system.



MEMO

SCHEMATIC DIAGRAM

GENERATOR UNIT(X71-1080-00)



D1~42,64,65 : 1S1588
D43~46 : U0-5B
D47~54 : 10D-1
D55~57 : PG4132S
D58~62 : AR4113S
D63 : AR5134S

IC1,7	SN74LS93
IC2,3,6	SN74LS92
IC4,29	SN74LS73
IC5	SN74LS90
IC8	SN74S04
IC9,33	SN74LS04
IC10,16	SN74LS20
IC11,12,19,28,34,47,48	SN74LS74
IC13,18	SN74LS27
IC14	SN7408
IC15,20,24,25,31,40,46	SN74LS00
IC17,26	SN74S112
IC21	SN74LS42
IC22,23,32,39	SN74LS02
IC27	SN7475
IC30	SN74LS10
IC35	SN74LS86
IC36,37	SN74LS123
IC43	SN7475
IC38,44	SN74LS32
IC41,42	SN74LS03
IC45	SN74LS08
IC49,50	MC1496
IC51	MC7805
IC52,53	MC7812

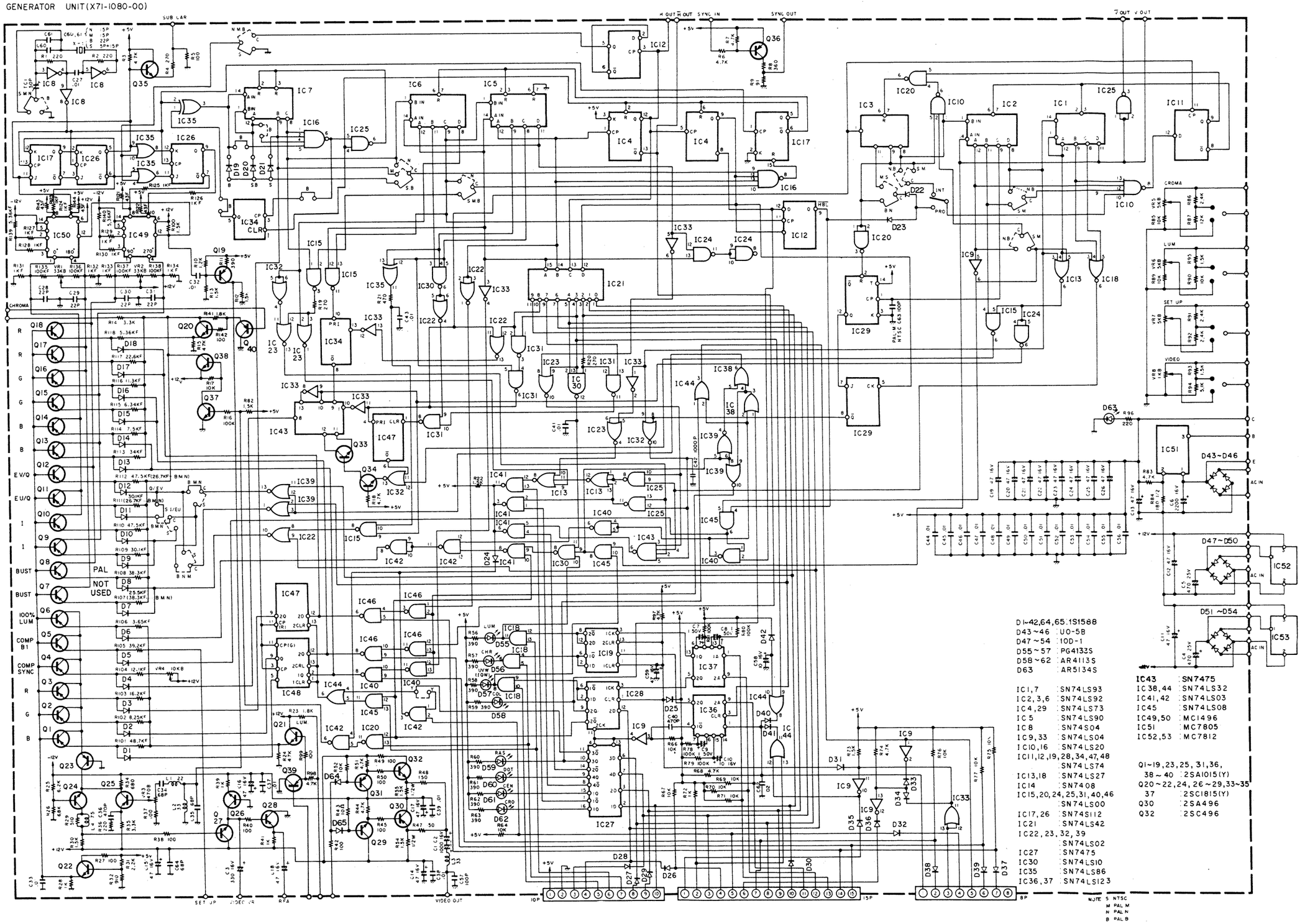
Q1~19,23,25,31,36, 38~40	2SA1015(Y)
Q20~22,24,26~29,33~35 37	2SC1815(Y)
Q30	2SA496
Q32	2SC496

NOTE S NTSC
M PAL M
N PAL N
B PAL B

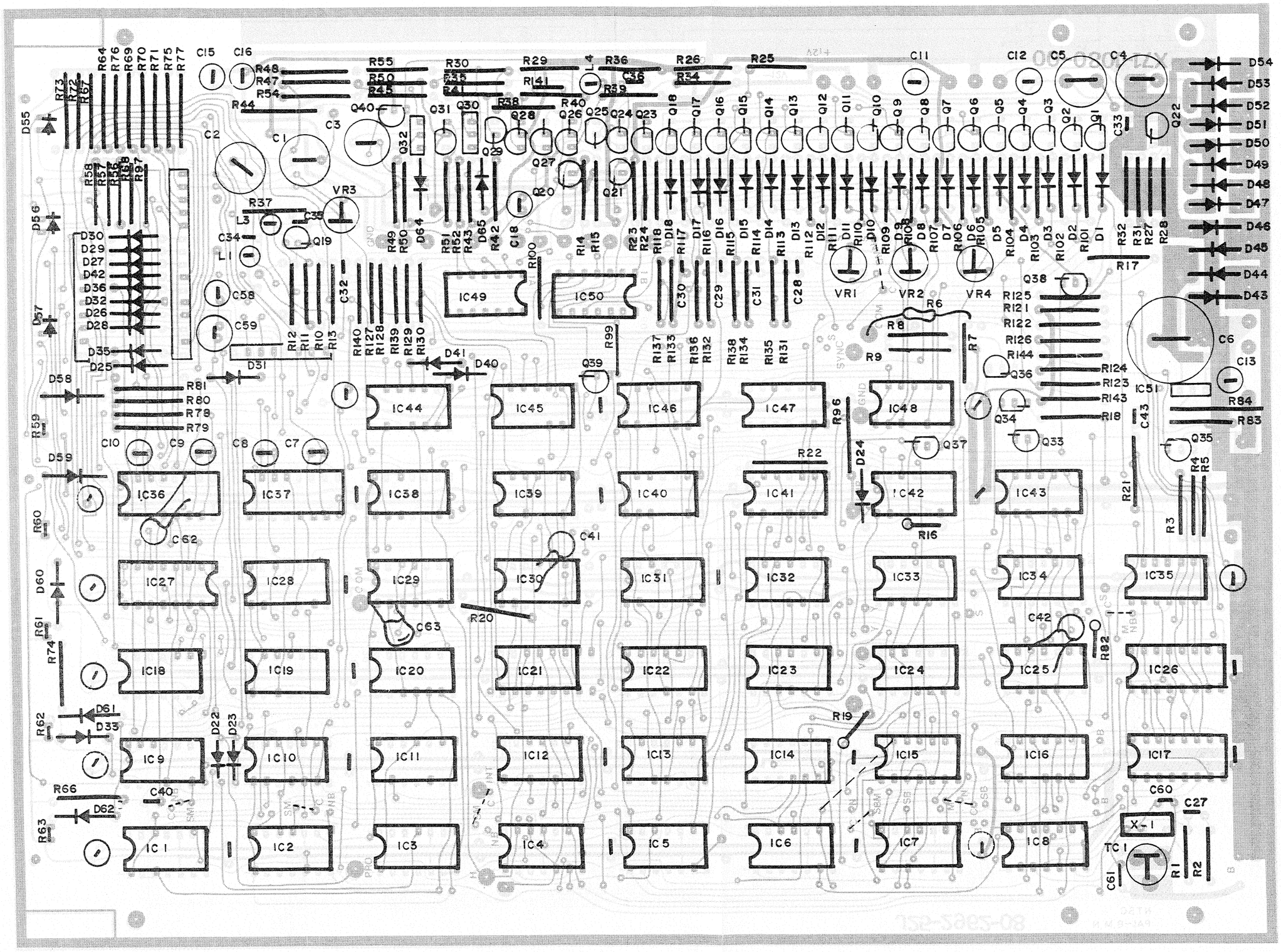
MEMO

SCHEMATIC DIAGRAM

GENERATOR UNIT(X71-1080-00)

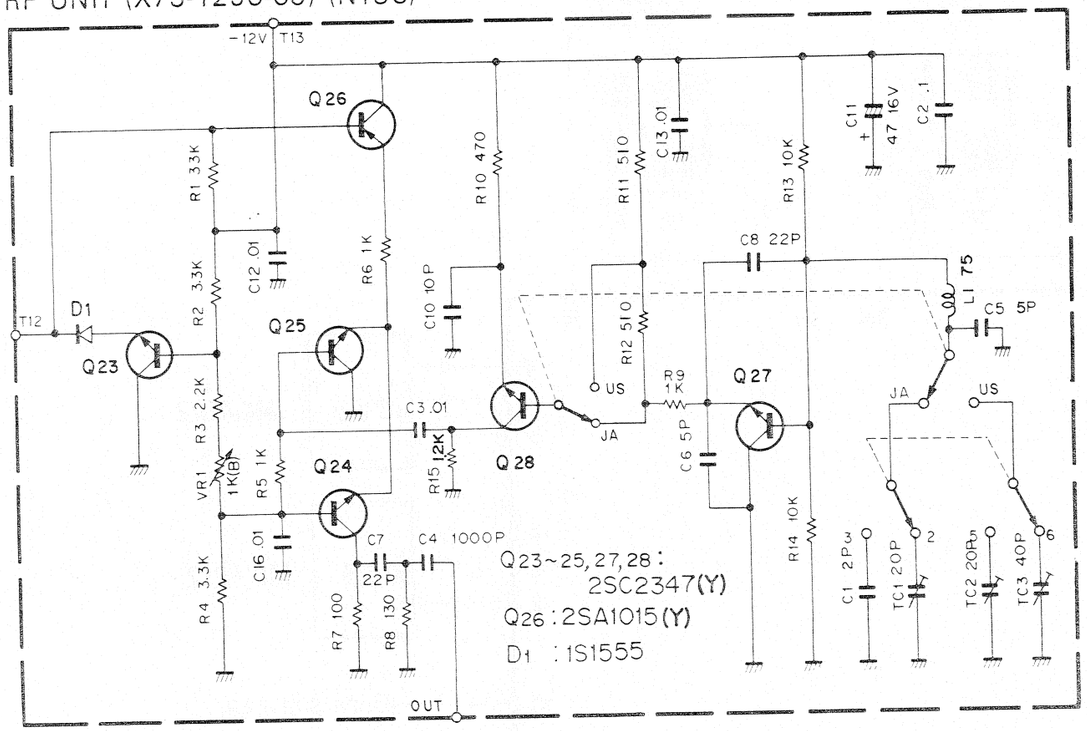


P.C. BOARD

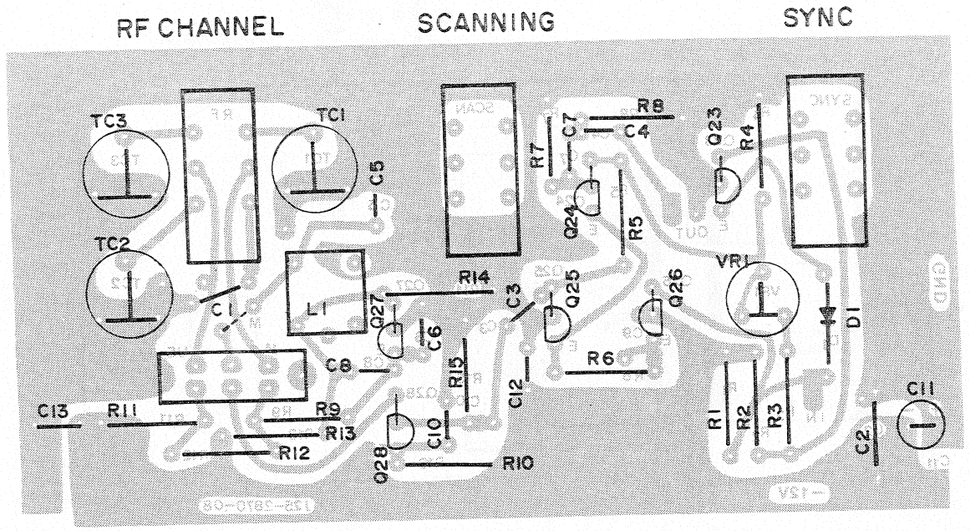

C15
C16
C11
C12
C5
C4
C33
Q22
D54
D53
D52
D51
D50
D49
D48
D47
D46
D45
D44
D43
R64
R76
R69
R70
R71
R75
R77
R73
R72
R67
R48
R47
R54
R55
R50
R45
R30
R35
R41
R29
R141
R36
R39
R26
R34
R25
R44
Q40
C3
C2
C1
Q31
Q30
R38
Q28
Q26
Q25
Q24
Q23
Q18
Q17
Q16
Q15
Q14
Q13
Q12
Q11
Q10
Q9
Q8
Q7
Q6
Q5
Q4
Q3
Q2
Q1
Q32
Q29
Q27
Q21
R40
R20
D55
R58
R57
R56
R97
D56
D30
D29
D27
D42
D36
D32
D26
D28
D35
D25
D57
D58
R59
R81
R80
R78
R79
C10
C9
C8
C7
D59
R60
D60
R61
R74
D61
D33
R62
R66
D62
R63
R37
L3
C34
L1
C35
Q19
VR3
C58
C59
D31
R49
R50
D64
R51
R52
R43
D65
R42
C18
R100
R14
R15
R23
R24
R118
D18
R117
D17
R116
D16
R115
D15
R114
D14
R113
D13
R112
D12
R111
D11
R110
D10
R109
D9
R108
D8
R107
D7
R106
D6
R105
D5
R104
D4
R103
D3
R102
D2
R101
D1
R32
R31
R27
R28
R17
VR1
VR2
VR4
R6
R8
R9
R7
Q38
R125
R121
R122
R126
R144
Q36
R124
R123
R143
R18
Q34
Q33
C6
C13
IC51
R84
R83
Q35
R4
R5
R3
R21
C43
R12
R11
R10
R13
C32
R140
R127
R128
R139
R129
R130
IC49
IC50
R99
D41
D40
Q39
R137
R133
R136
R132
R138
R134
R135
R131
C30
C29
C31
C28
IC44
IC45
IC46
IC47
IC48
R96
R22
D24
Q37
R16
IC36
IC37
IC38
IC39
IC40
IC41
IC42
IC43
C62
C41
IC27
IC28
IC29
IC30
IC31
IC32
IC33
IC34
IC35
C63
R20
C42
R82
IC18
IC19
IC20
IC21
IC22
IC23
IC24
IC25
IC26
D22
D23
R19
IC9
IC10
IC11
IC12
IC13
IC14
IC15
IC16
IC17
C40
C60
C27
X-1
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
TC1
C61
R1
R2

SCHEMATIC DIAGRAM

RF UNIT (X73-1290-00) (NTSC)

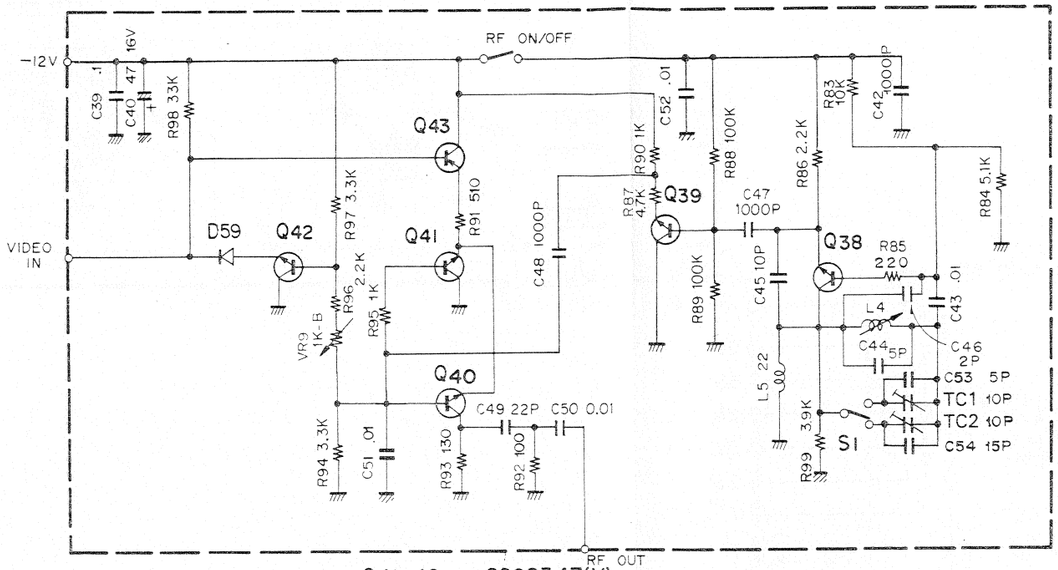


P.C. BOARD



SCHEMATIC DIAGRAM

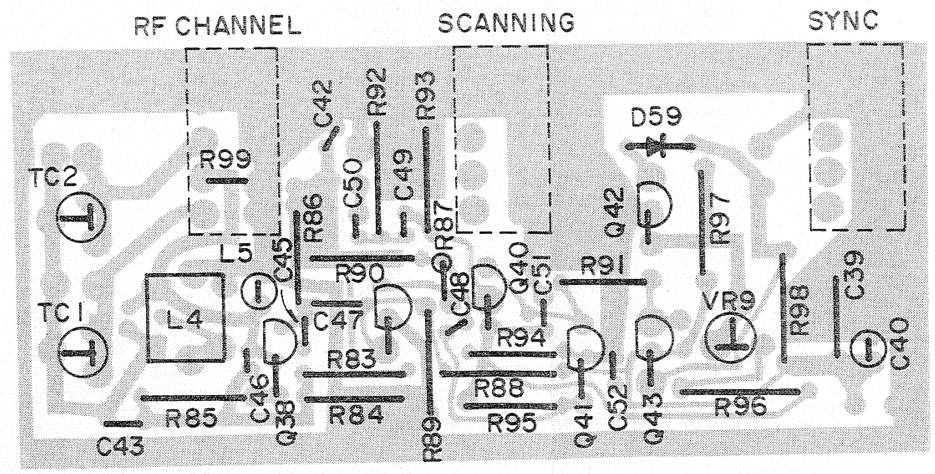
RF UNIT (X71-1050-00) (PAL B.M.N)



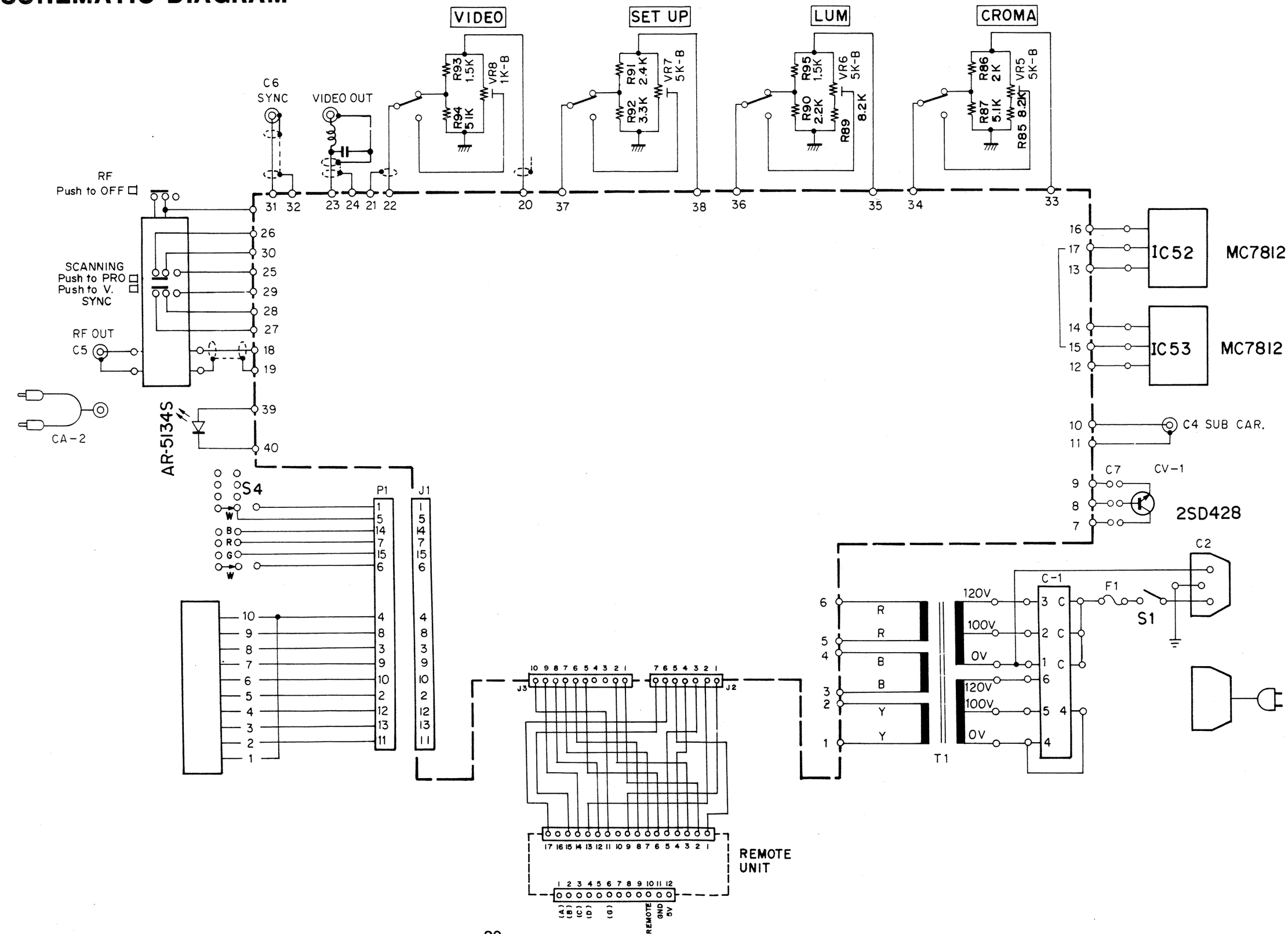
Q41,42 : 2SC2347(Y)
Q43 : 2SA1015(Y)
D59 : 1S1588
Q38 : 2SC1815(Y)
Q39,40 : 2SC1815(Y)

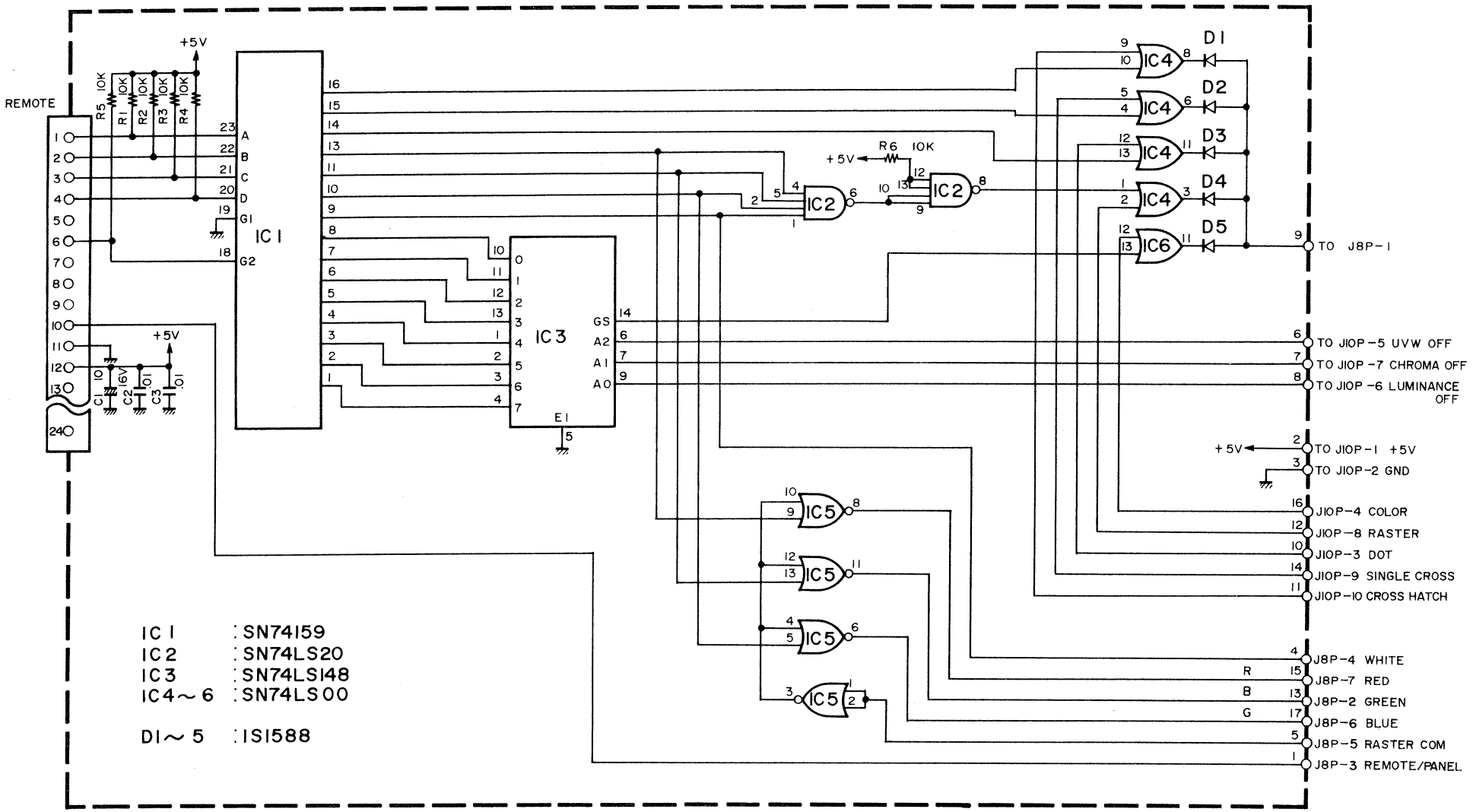
CG-912

P.C. BOARD



SCHEMATIC DIAGRAM




REMOTE
+5V
R5 10K
R1 10K
R2 10K
R3 10K
R4 10K
IC1
IC2
IC3
IC4
IC5
IC6
D1
D2
D3
D4
D5
R6 10K
C1 10 16V
C2 .01
C3 .01
E1
GS
A2
A1
A0
TO J8P-1
TO J1OP-5 UVW OFF
TO J1OP-7 CHROMA OFF
TO J1OP-6 LUMINANCE OFF
TO J1OP-1 +5V
TO J1OP-2 GND
J1OP-4 COLOR
J1OP-8 RASTER
J1OP-3 DOT
J1OP-9 SINGLE CROSS
J1OP-10 CROSS HATCH
J8P-4 WHITE
J8P-7 RED
J8P-2 GREEN
J8P-6 BLUE
J8P-5 RASTER COM
J8P-3 REMOTE/PANEL
R
B
G
IC1 : SN74159
IC2 : SN74LS20
IC3 : SN74LS148
IC4~6 : SN74LS00
D1~5 : 1S1588

REMOTE UNIT